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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/501,713
Filing Date: July 19, 2004
Appellant(s): HENNIGE ET AL.

Stefan U. Koschmieder, Ph.D.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 8/16/10 appealing from the Office action
mailed 4/16/10.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

1, 3-5, 7-12, 14-22, 24-28, 30-38, 40, 46-51, 53-59.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

6,309,545	Penth et al	10-2001
5,639,555	Bishop	6-1997
5,324,579	Sassa et al	6-1994

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 3-5, 7-12, 14-22, 24-28, 30-38, 40, 46-51, 53-59 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being

unpatentable over claims 1-36 of copending Application No. 10/504,144, in view of Penth et al, U.S. Patent No. 6,309,545 and Bishop, U.S. Patent No. 5,639,555

Although the conflicting claims are not identical, they are not patentably distinct from each other because each discloses a membrane comprising a fibrous substrate and a permeable ceramic coating. US '144 does not set forth the claimed adhesion promoter. Penth discloses a fibrous substrate coated with a permeable inorganic coating wherein the coating further comprises a silane coupling agent, (see examples 1.8 and 1.9), but does not disclosed the claimed silane coupling agent. Bishop teaches that the claimed silane coupling agents are known in the art to be useful as silane coupling agents for use in improving bonding between resins and metal oxides along with the silane coupling agents used in Penth. See col. 2, lines 65 - col. 4, line 39. Therefore, it would have been obvious to have incorporated a silane coupling agent as taught by Penth and Bishop in the composition of US '144, in order to improve bonding between the inorganic coating and the substrate. With regard to the newly added claims, since Penth teaches the same types of fibers, they would meet the limitations of claim 49 regarding melting point. With regard to the claimed adhesion promoters of claims 50 and 51, these are taught by Bishop as set forth above. With regard to the limitation that the adhesion promoters are present on the surface of the non-woven fiber, since Penth does not teach adding the adhesion promoter to the polymer melt but instead using the adhesion promoters in the sol, the adhesion promoter would be present only on the surface of the non-woven polymeric fiber.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1, 3-5, 7-12, 14-22, 24-28, 30-38, 40, 46-51, 53-59 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-25 of copending Application No. 10/524,143, in view of Penth et al, U.S. Patent No. 6,309,545 and Bishop, U.S. Patent No. 5,639,555. Although the conflicting claims are not identical, they are not patentably distinct from each other because each discloses a membrane comprising a fibrous substrate and a permeable ceramic coating. US '144 does not set forth the claimed adhesion promoter. Penth discloses a fibrous substrate coated with a permeable inorganic coating wherein the coating further comprises a silane coupling agent, (see examples 1.8 and 1.9), but does not disclosed the claimed silane coupling agent. Bishop teaches that the claimed silane coupling agents are known in the art to be useful as silane coupling agents for use in improving bonding between resins and metal oxides along with the silane coupling agents used in Penth. See col. 2, lines 65 - col. 4, line 39. Therefore, it would have been obvious to have incorporated a silane coupling agent as taught by Penth and Bishop in the composition of US '143, in order to improve bonding between the inorganic coating and the substrate. With regard to the newly added claims, since Penth teaches the same types of fibers, they would meet the limitations of claim 49 regarding melting point. With regard to the claimed adhesion promoters of claims 50 and 51, these are taught by Bishop as set forth above. With regard to the limitation that

the adhesion promoters are present on the surface of the non-woven fiber, since Penth does not teach adding the adhesion promoter to the polymer melt but instead using the adhesion promoters in the sol, the adhesion promoter would be present only on the surface of the non-woven polymeric fiber.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1, 3-5, 7-12, 14-22, 24-28, 30-38, 40, 46-51, 53-59 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-25 of copending Application No. 10/524,669 in view of Penth et al, U.S. Patent No. 6,309,545 and Bishop, U.S. Patent No. 5,639,555.

Although the conflicting claims are not identical, they are not patentably distinct from each other because each discloses a membrane comprising a fibrous substrate and a permeable ceramic coating. US '144 does not set forth the claimed adhesion promoter. Penth discloses a fibrous substrate coated with a permeable inorganic coating wherein the coating further comprises a silane coupling agent, (see examples 1.8 and 1.9), but does not disclosed the claimed silane coupling agent. Bishop teaches that the claimed silane coupling agents are known in the art to be useful as silane coupling agents for use in improving bonding between resins and metal oxides along with the silane coupling agents used in Penth. See col. 2, lines 65 - col 4, line 39. Therefore, it would have been obvious to have incorporated a silane coupling agent as taught by Penth and Bishop in the composition of US '669, in order to improve bonding

between the inorganic coating and the substrate. With regard to the newly added claims, since Penth teaches the same types of fibers, they would meet the limitations of claim 49 regarding melting point. With regard to the claimed adhesion promoters of claims 50 and 51, these are taught by Bishop as set forth above. With regard to the limitation that the adhesion promoters are present on the surface of the non-woven fiber, since Penth does not teach adding the adhesion promoter to the polymer melt but instead using the adhesion promoters in the sol, the adhesion promoter would be present only on the surface of the non-woven polymeric fiber.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1, 3-5, 7-12, 14-22, 24-28, 30-38, 40, 46-51, 53-59 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-24 of copending Application No. 10/519,097 in view of Penth et al, U.S. Patent No. 6,309,545 and Bishop, U.S. Patent No. 5,639,555 .

Although the conflicting claims are not identical, they are not patentably distinct from each other because each discloses a membrane comprising a fibrous substrate and a permeable ceramic coating. US '144 does not set forth the claimed adhesion promoter. Penth discloses a fibrous substrate coated with a permeable inorganic coating wherein the coating further comprises a silane coupling agent, (see examples 1.8 and 1.9), but does not disclosed the claimed silane coupling agent. Bishop teaches that the claimed silane coupling agents are known in the art to be useful as silane

coupling agents for use in improving bonding between resins and metal oxides along with the silane coupling agents used in Penth. See col. 2, lines 65 - col 4, line 39. Therefore, it would have been obvious to have incorporated a silane coupling agent as taught by Penth and Bishop in the composition of US '097, in order to improve bonding between the inorganic coating and the substrate. With regard to the newly added claims, since Penth teaches the same types of fibers, they would meet the limitations of claim 49 regarding melting point. With regard to the claimed adhesion promoters of claims 50 and 51, these are taught by Bishop as set forth above. With regard to the limitation that the adhesion promoters are present on the surface of the non-woven fiber, since Penth does not teach adding the adhesion promoter to the polymer melt but instead using the adhesion promoters in the sol, the adhesion promoter would be present only on the surface of the non-woven polymeric fiber.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1, 3-5, 7-12, 14-22, 24-28, 30-38, 40, 46-51, 53-59 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-29 of copending Application No. 10/575,268 in view of Penth et al, U.S. Patent No. 6,309,545 and Bishop, U.S. Patent No. 5,639,555.

Although the conflicting claims are not identical, they are not patentably distinct from each other because each discloses a membrane comprising a fibrous substrate and a permeable ceramic coating. US '144 does not set forth the claimed adhesion

promoter. Penth discloses a fibrous substrate coated with a permeable inorganic coating wherein the coating further comprises a silane coupling agent, (see examples 1.8 and 1.9), but does not disclosed the claimed silane coupling agent. Bishop teaches that the claimed silane coupling agents are known in the art to be useful as silane coupling agents for use in improving bonding between resins and metal oxides along with the silane coupling agents used in Penth. See col. 2, lines 65 - col 4, line 39. Therefore, it would have been obvious to have incorporated a silane coupling agent as taught by Penth and Bishop in the composition of US '268, in order to improve bonding between the inorganic coating and the substrate. With regard to the newly added claims, since Penth teaches the same types of fibers, they would meet the limitations of claim 49 regarding melting point. With regard to the claimed adhesion promoters of claims 50 and 51, these are taught by Bishop as set forth above. With regard to the limitation that the adhesion promoters are present on the surface of the non-woven fiber, since Penth does not teach adding the adhesion promoter to the polymer melt but instead using the adhesion promoters in the sol, the adhesion promoter would be present only on the surface of the non-woven polymeric fiber.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1, 3-5, 7-12, 14-22, 24-28, 30-38, 40, 46-51, 53-59 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being

unpatentable over claims 1-24 of copending Application No. 10/575,759 in view of Penth et al, U.S. Patent No. 6,309,545 and Bishop, U.S. Patent No. 5,639,555.

Although the conflicting claims are not identical, they are not patentably distinct from each other because each discloses a membrane comprising a fibrous substrate and a permeable ceramic coating. US '144 does not set forth the claimed adhesion promoter. Penth discloses a fibrous substrate coated with a permeable inorganic coating wherein the coating further comprises a silane coupling agent, (see examples 1.8 and 1.9), but does not disclosed the claimed silane coupling agent. Bishop teaches that the claimed silane coupling agents are known in the art to be useful as silane coupling agents for use in improving bonding between resins and metal oxides along with the silane coupling agents used in Penth. See col. 2, lines 65 - col 4, line 39. Therefore, it would have been obvious to have incorporated a silane coupling agent as taught by Penth and Bishop in the composition of US '759, in order to improve bonding between the inorganic coating and the substrate. With regard to the newly added claims, since Penth teaches the same types of fibers, they would meet the limitations of claim 49 regarding melting point. With regard to the claimed adhesion promoters of claims 50 and 51, these are taught by Bishop as set forth above. With regard to the limitation that the adhesion promoters are present on the surface of the non-woven fiber, since Penth does not teach adding the adhesion promoter to the polymer melt but instead using the adhesion promoters in the sol, the adhesion promoter would be present only on the surface of the non-woven polymeric fiber.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1, 3-5, 7-12, 14-22, 24-28, 30-38, 40, 46-51, 53-59 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 22-42 of copending Application No. 10/575,734 in view of Penth et al, U.S. Patent No. 6,309,545 and Bishop, U.S. Patent No. 5,639,555.

Although the conflicting claims are not identical, they are not patentably distinct from each other because each discloses a membrane comprising a fibrous substrate and a permeable ceramic coating. US '144 does not set forth the claimed adhesion promoter. Penth discloses a fibrous substrate coated with a permeable inorganic coating wherein the coating further comprises a silane coupling agent, (see examples 1.8 and 1.9), but does not disclosed the claimed silane coupling agent. Bishop teaches that the claimed silane coupling agents are known in the art to be useful as silane coupling agents for use in improving bonding between resins and metal oxides along with the silane coupling agents used in Penth. See col. 2, lines 65 - col 4, line 39. Therefore, it would have been obvious to have incorporated a silane coupling agent as taught by Penth and Bishop in the composition of US '734, in order to improve bonding between the inorganic coating and the substrate. With regard to the newly added claims, since Penth teaches the same types of fibers, they would meet the limitations of claim 49 regarding melting point. With regard to the claimed adhesion promoters of claims 50 and 51, these are taught by Bishop as set forth above. With regard to the

limitation that the adhesion promoters are present on the surface of the non-woven fiber, since Penth does not teach adding the adhesion promoter to the polymer melt but instead using the adhesion promoters in the sol, the adhesion promoter would be present only on the surface of the non-woven polymeric fiber.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1, 3-5, 7-12, 14-22, 24-28, 30-31, 33, 40, 46-51, 53-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Penth et al, U.S. Patent No. 6,309,545 in view of Bishop, U.S. Patent No. 5,639,555.

Penth discloses a permeable composite material comprising a fibrous substrate which may be formed from natural or synthetic fibers having a coating disposed thereon. See col. 3, lines 61- col. 4, line 10. The synthetic fibers can be polyamide. The total thickness of the composite material may be 5-150 micrometers. See claim 62. The fibrous substrate can comprise pores or openings having a size of 0.02-500 micrometers which correspond to a minimum value or 20 nm which is within the claimed range. See col. 3, lines 39-60. The coating can comprise metal oxides including those claimed. See col. 6, lines 21-43. The coating can be applied by stamping, pressing, rolling, blade or a brushing, dipping, spraying or pouring. See col. 5, lines 32-36. The inorganic material can comprise a sol comprising the metalloid oxide sol. See col. 5, lines 48-53. The membrane can be bent to a radius of 1 mm without breaking. See col. 2, lines 55-60. The sols are obtained by hydrolyzing at least one metallic compound, at

least one metalloid compound or at least one composition metallic compound. It is advantageous to carry out the hydrolysis of the compounds to be hydrolyzed with at least half the mol. ratio of water, water vapor or ice in relation to the hydrolysable group of the hydrolysable compound. The hydrolyzed compound can be treated with at least one organic or inorganic acid. Preferably the percentage by mass of the suspended component should be 0.1 to 500 times the hydrolyzed compound used. The suspension consisting of sol and compounds to be suspended preferably has a ratio of sol to compounds to be suspended of 0.1: 100 to 100: 0.1. See col. 5, line 54 0 col. 6, line 65.

Penth teaches including known silane coupling agents such as methyl triethoxysilane and tetraethoxysilane in the sol, (see examples 1.8 and 1.9) but does not teach the particularly claimed glycidyoxy functionalized silane or methacryloxy-functionalized silane.

Bishop teaches that silane coupling agents are known in the art as providing improved bonding between metal oxides and resins. See col. 1, lines 18-26. Bishop teaches that the claimed silane coupling agents are known and are equivalent to those claimed by Penth. See col. 2, lines 31 - col. 4, line 39.

Therefore, it would have been obvious to one of ordinary skill in the art to have employed other known and useful silane coupling agents as taught by Bishop instead of those employed in Penth, in view of the teaching of Bishop that such coupling agents improve bonding between ceramics and resins and that the claimed coupling agents were recognized as equivalent, known and useful coupling agents to those employed in

examples 1.8 and 1.9 of Penth. With regard to the newly added claims, since Penth teaches the same types of fibers, they would meet the limitations of claim 49 regarding melting point. With regard to the claimed adhesion promoters of claims 50 and 51, these are taught by Bishop as set forth above. With regard to the limitation that the adhesion promoters are present on the surface of the non-woven fiber, since Penth does not teach adding the adhesion promoter to the polymer melt but instead using the adhesion promoters in the sol, the adhesion promoter would be present only on the surface of the non-woven polymeric fiber.

Penth differs from the claimed invention because it does not disclose the claimed porosity or fiber diameters. However, since Penth teaches employing a porous substrate, and teaches that the porosity of the material can be controlled, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the particular porosity and pore size which produced a membrane having the desired porosity. Since the size of the fibers would be related to the size of the pores, (i.e., large fibers produce larger pores while small fibers produce smaller pores) it further would have been obvious to have selected the fiber size through the process of routine experimentation which produced a material having the desired porosity. With regard to the newly added claims 53-58, it is noted that Penth discloses a coating which consists of the inorganic oxide and the adhesion promoters in the sol. Since there is no other way to apply the coating set forth in the specification other than forming a sol, the limitations of claim 53 are not seen as excluding the presence of the sol components. . With regard to the claimed adhesion promoters, Bishop teaches the claimed adhesion

promoters and teaches using more than one adhesion promoter, (see examples of Bishop), and therefore, it would have been obvious to have selected the adhesion promoters from among the known adhesion promoters set forth in Bishop which provided the optimum bond between the coating and the substrate.

Claims 32, 34-38, 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Penth in view of Bishop as applied to claims above, and further in view of Sassa et al, U.S. patent No. 5,324,579.

Penth differs from the claimed invention because while Penth teaches that the fibers may be "plastic" fibers generally, and teaches polyamide fibers specifically, Penth does not disclose the other particularly claimed fibers.

Sassa et al teaches that fibers such as PTFE, may be combined with other types of synthetic plastic fibers including polyesters, polyamide, polyolefins, polyimide and polyacrylonitrile fibers in order to form substrates which are used to form filter materials. See col. 5, line 56-col. 6, line 56. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have employed the polymeric fiber materials disclosed in Sassa in the invention of Penth, motivated by the teaching of Sassa that the other polymeric fibers were recognized in the art as equivalent to the polyamide fibers specifically taught by Penth and also because of the art recognized suitability of such fibers for the purpose of making substrates for filtration.

(10) Response to Argument

Appellant argues that the evidence submitted on January 21, 2010 shows how pore size relates to hole size and how hole size relates to porosity and shows that the porosity shown in Penth is nowhere near the claimed more than 50% porosity. Appellant asserts that the evidence of record shows that a mesh having a mesh size of 90 μm corresponds to a porosity of 0.3% as calculated on the Tyler scale. However, as set forth in the response of 11/23/09, the data submitted is for a single example of Penth which discloses a woven mesh. Penth is not limited to what is shown in example 1. Penth teaches perforating the material and/or otherwise controlling the size of the pores in order to control the permeability of the filters and membranes of the resulting composite materials and therefore it would have been obvious to have selected the desired porosity through the process of routine experimentation depending on the desired porosity in the finished material. See col. 3, lines 1-10. Further, in the data used by Appellant to show that the structure of example 1 of Penth did not meet the requirements of greater than 50% porosity, Appellant states that the pore size is 0.4 μm which resulted in a porosity of 0.3%. See page 9, line 3 of the Appeal brief. Appellant states that the pore size of Penth would have to be increased by 100 times to meet the requirements of 50% porosity as claimed. However, Penth teaches pore sizes of from 5-500 μm so Penth teaches pore sizes much greater than 100 times the pore sizes of example 1 as calculated by Appellant. 100 times 0.4 μm would be about 40 μm . Penth teaches values of up to 500 μm . See col. 4, lines 11-16. Therefore, even accepting all of Appellant's calculations, Penth still would meet the claimed porosity of greater than

50%.

Appellant argues that Bishop does not teaches that glycidyoxy- or methacryloyloxy- functionalized silanes are equivalent to the coupling agents taught in Penth, because Bishop discloses the use of glycidyoxy- or methacryloyloxy- functionalized silanes only insofar as they are used in combination with a tris(silylorgano) amine-containing composition. However, initially it is noted that claim 1 does not preclude the presence of other components. Further, the examiner is employing Bishop as a teaching reference. Bishop clearly states at col. 1, lines 18-22, that silane coupling agents are well known and are used to increase the adhesive characteristics of many bonds. Bishop then sets forth a list of well known and conventional silane coupling agents which were known to be useful in the art. This list includes both those silane coupling agents claimed and those employed in Penth. Thus, Bishop is not relied on for the particular use of the silane coupling agents in the structure of Bishop, but rather to establish that the claimed silane coupling agents were recognized in the art as known and equivalent to those silane coupling agents taught in Penth. Bishop teaches the claimed adhesion promoters and teaches using more than one adhesion promoter and therefore, it would have been obvious to have selected the adhesion promoters from among the known adhesion promoters set forth in Bishop which provided the optimum bond between the coating and the substrate. Similarly, with regard to claim 53, for the person of ordinary skill in the art to apply the teaching of Bishop does not require that the entire composition of Bishop be bodily incorporated into the structure of Penth. The person of ordinary skill in the art would have been able

to recognize that Bishop establishes that the claimed silane coupling agents are known to be equivalent to those employed in Penth and to have selected from among these other known and useful silane coupling agents one or more known and useful silane coupling agents in order to form the strongest bond in the product of Penth without having to incorporate the entire composition of Bishop in to the composition of Penth. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. In re Fout, 675 F.2d 297, 213 USPQ 532 (CCPA 1982).

With regard to the combination of Penth and Bishop with Sassa, Appellant argues that Sassa teaches naked synthetic fibers as an additive to a PTFE fiber and does not teach a fibers which is coated with a ceramic coating. However, Penth already teaches using plastic fibers generally and is drawn to forming filter materials and membranes. Sassa is simply relied on for the teaching of other known synthetic or plastic fibers which were known in the art as being useful for forming filter materials. Once the fibers were employed in the structure of Penth, they would be coated with the ceramic coating, they would not have to be already coated or precoated. Therefore, the fact that the fibers were not already coated in Sassa is not relevant to whether the teachings of Sassa would useful to the person of ordinary skill in the art in selecting other known and useful plastic fibers for use in the filters and membranes of Penth.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Elizabeth M. Cole/
Primary Examiner, Art Unit 1798

Conferees:

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1786

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